Food Control 41 (2014) 82–90

Contents lists available at ScienceDirect

Food Control

journal homepage: www.elsevier.com/locate/foodcont

Perceptions, behaviours and kitchen hygiene of people who have and have not suffered campylobacteriosis: A case control study

Caroline Millman [a,*], Dan Rigby [a], Gareth Edward-Jones [b], Lorraine Lighton [c], Davey Jones [b]

[a] School of Social Sciences, University of Manchester, Manchester, M13 9PL, UK
[b] School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Bangor, Gwynedd, LL57 2UW, UK
[c] Greater Manchester Public Health England Centre Health Protection Team, Sentinel House, Eccles, M30 0NJ, UK

ARTICLE INFO

Article history:
Received 19 July 2012
Received in revised form
21 December 2013
Accepted 4 January 2014

Keywords:
Optimistic bias
Campylobacter
Domestic kitchen
Case control study
Risk perception

ABSTRACT

Whilst the scale of food poisoning in the home is not fully understood, the increase in sporadic cases of *Campylobacter* continues to place focus on home hygiene and domestic food safety practices. Domestic hygiene has rarely been identified as a risk factor for the incidence of campylobacteriosis but due to the high levels of sporadic cases of *Campylobacter*, cross contamination from kitchen practices remains of significant interest. Due to the complexities of human nature, finding the true risk perceptions and practices that take place in the kitchen is challenging, with social desirability bias affecting the results of surveys and optimistic bias influencing risk perceptions. This study looks at self-reported kitchen behaviours and perceptions of people who have had campylobacteriosis in comparison to people who have not had food poisoning. It also investigates microbiological kitchen hygiene within a smaller sample. The survey crucially includes a longitudinal element to investigate any change that may take place after a period of six months has elapsed. Optimistic bias was evident in both groups and no significant difference in perception was noted in the baseline study. However, the longitudinal study showed that individuals who had not had food poisoning increased their optimism, introducing a significant difference in optimistic bias between the two groups after six months had elapsed. Self-reported kitchen behaviours also exhibited a difference between the two groups, with the individuals who had campylobacteriosis responding more favourably with the exception of washing chicken and washing salad leaves sold in a bag. No evidence of kitchen hygiene differences could be found between the people who had suffered campylobacteriosis in comparison to people who had not had food poisoning. The results of the survey demonstrate that more effective food safety communication is required. Important messages such as 'not washing chicken' seem not to have been absorbed and the good practices become routine. These messages need particularly to be aimed towards people who may not perceive themselves as being at risk of getting food poisoning, such as the young, although the challenge of changing the practice of those who perceive themselves to be at low risk remains.

1. Introduction

Each year, 11 million working days are lost in the UK due to infectious intestinal disease which is estimated to cost the UK approximately £2 billion annually (FSA, 2010/2011). *Campylobacter* is the most commonly reported bacterial pathogen (9.3 cases per 1000 person-years), with an estimated 500,000 cases occurring annually in the UK (Tam et al., 2012).

Despite the high recorded and estimated incidence of *Campylobacter*, outbreaks are rarely identified, with much of the incidence being attributed to sporadic infection. More recently it has been reported that this pattern has started to change, with an increasing number of outbreaks associated with undercooked chicken and chicken livers (HPA, 2011; Little, Gormley, Rawal, & Richardson, 2010; Strachan et al., 2012). Studies of campylobacteriosis have highlighted risk factors that include travel abroad, raw meat, milk, untreated water and handling pets with diarrhoea (Adak, Cowden, Nicholas, & Evan, 1995; Doorduyn et al., 2010; Kapperud et al., 2003; Neimann, Engberg, Molbak, & Wegener, 2003; Rodrigues et al., 2001). The consumption of poultry (particularly chicken) is the most frequently identified source of infection, with Neimann et al. (2003) listing 11 studies in a 20 year period (1979–1998). However, Rodrigues et al. (2001) suggest that consumption of chicken may be less important as a source for sporadic

* Corresponding author. Tel.: +44 7970 115961.
E-mail address: caroline.millman@manchester.ac.uk (C. Millman).

0956-7135/$ – see front matter © 2014 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.foodcont.2014.01.002

Campylobacter cases than cross contamination from raw poultry (Kapperud et al., 2003), indicating that poor domestic hygiene practices may be a significant risk factor.

Studies of kitchen practices generally take the form of self-reported surveys, which focus on specific questions of practice or attitudes and perceptions towards food safety (Gilbert et al., 2007; Redmond & Griffith, 2004a). Focus groups have been used to investigate practices in sub-groups of the population (Gauci & Gauci, 2005; Gettings & Kiernan, 2001; Sudershan, Rao, Rao, Rao, & Polasa, 2008; Trepka, Murunga, Cherry, Huffman, & Dixon, 2006). However, observational studies (Abbot, Byrd-Bredbenner, Schaffner, Bruhn, & Blalock, 2007; Anderson, Shuster, Hansen, Levy, & Volk, 2004) have been key in revealing kitchen practices (Redmond & Griffith, 2003). Microbiological studies often include observational elements in addition to sampling (Fischer et al., 2007; Gorman, Bloomfield, & Adley, 2002; Haysom & Sharp, 2005; Mylius, Nauta, & Havelaar, 2007) and in many cases laboratory analysis has been based on re-enactments of behavioural studies (Mylius et al., 2007; Redmond, Griffith, Slader, & Humphrey, 2001). Only Parry et al. have investigated the perceptions and practices of people who have had confirmed food poisoning (Parry, Miles, Tridente, Palmer, & South and East Wales Infectious Disease Group, 2004; Parry et al., 2005).

Although it is not known what proportion of cases of *Campylobacter* can be attributed to food prepared or eaten at home, the UK Food Standards Agency (FSA) has identified improved domestic food safety as critical in reducing the burden of illness (FSA, 2001). Consumer behaviour is not regulated and in this regard the prevention of food safety hazards depends on good food safety and hygienic practices being adopted and becoming 'second nature' in the home. In other words, food safety practices have to become an ingrained habit to ensure that they are repeatable on each occasion that food preparation is undertaken. In order to make progress in this unregulated area it is essential that consumer behaviour is better understood and that education and food safety communication strategies are developed appropriately, in order to try to direct the consumer towards making the safe preparation of food a habit (Fischer, Frewer, & Nauta, 2006; Redmond & Griffith, 2004b).

Whilst a more detailed understanding of food risk perceptions are necessary to establish what people do or don't do in order to address poor practices, it is widely reported that risk perceptions are influenced by optimistic bias (OB), so analysis of personal risk has also focussed on the presence, extent and causes of OB (Fischer et al., 2006; Miles, Braxton, & Frewer, 1999; Miles & Scaife, 2003; Parry et al., 2004; Sargeant, Majowicz, Sheth, & Edge, 2010; Sharot, 2011; Weinstein, 1987). Optimistic bias is "the inclination to overestimate the likelihood of encountering positive events in the future and to underestimate the likelihood of experiencing negative events" (Sharot, 2011: p. xv). OB is evident in many situations. With respect to food safety, OB occurs where individuals who believe that they are less likely to be affected by food safety hazards also believe that their risk of food poisoning is less than the average person. OB is also evident in the finding that people believe that they are in control of microbiological hazards when they prepare food themselves (Miles et al., 1999), but food prepared by others is much more hazardous to them (Frewer, Shepherd, & Sparks, 1994; Miles et al., 1999). It is believed that individuals who see themselves at lower risk of food poisoning (because of optimistic bias) are less likely to be sensitive to food safety awareness campaigns, believing that the messages are not for them (Redmond & Griffith, 2004b). It is thought that this can make educational initiatives to reduce risk more challenging. However, more research is required to assess if people do become more impervious to food safety messages the lower the risk they believe they are exposed to.

Explanations of OB are categorised into either motivational or cognitive, with motivational explanations based on the theory that "assume that individuals are motivated to make risk judgements that will not induce negative affect or threaten self-esteem, and so will maintain or promote psychological wellbeing" (Miles & Scaife, 2003: p. 15). Cognitive explanations for optimistic bias are centred on the failure of the individual to adopt the perspective of others. Individuals may conclude incorrectly that their chances differ from those of others, be influenced by any past experience (or absence of experience) or by comparison of themselves with a stereotype and incorrectly conclude that the hazard will not apply to them as they do not fit the stereotype (Miles & Scaife, 2003).

This study uses the principles of research undertaken by Parry et al. to investigate the food safety perceptions and extent of OB, in addition to assessing kitchen hygiene (Parry et al., 2004; Parry et al., 2005). Whilst the work of Parry focussed on people who had *Salmonella*, in comparison to people who have not had salmonellosis, we compare individuals who have had laboratory confirmed campylobacteriosis, with individuals who have not had laboratory confirmed food poisoning. We further extend this research by introducing a longitudinal element, revisiting food safety perceptions six months later.

Whilst the main survey elicited information regarding the existence and levels of OB, the use of questionnaires to elicit attitudes, awareness and behaviours suffers from certain limitations due to discrepancies between self reported practices and those in reality. This was partly addressed by environmental microbiological sampling in the kitchens of a small group, drawing on past research by Redmond et al. (2001), Fischer et al. (2007), Parry et al. (2004) and Parry et al. (2005).

In summary, the research questions that we asked are:

a) What is the level of optimistic bias and perception of food hygiene and food safety of individuals in the home and does having had campylobacteriosis promote any difference in optimistic bias in comparison to an individual that has not had food poisoning?
b) Does behaviour and optimistic bias change with time lapse following campylobacteriosis?
c) Is microbiological kitchen hygiene different between people who have, and have not, recently had campylobacteriosis?

2. Materials and methods

The case control study was conducted using a survey of self reported kitchen behaviours and food safety perceptions, in addition to a kitchen sampling programme for a subgroup of the main study. A longitudinal study surveyed kitchen behaviours and food safety perceptions six months later in the same cohort. Cases were defined as people aged 18 or over, who have had laboratory confirmed campylobacteriosis in Greater Manchester, England, whilst controls were matched (gender, age and general geographic location) individuals with no laboratory confirmation of food related illness in the previous five years.

2.1. Case and control recruitment

Participants in the study were recruited via two routes: via the Greater Manchester Health Protection Unit (HPU) and by snowball sampling for the recruitment of controls. The HPU receives laboratory reports on all isolates of *Campylobacter* from people resident in Greater Manchester and at the time of the study routinely sent enhanced surveillance questionnaires to all cases of *Campylobacter*. For this study, cases were initially contacted by the HPU with a letter of invitation, information sheet, consent form and paper-based